

HAND TOOL



SAFETY

Snap-on Tools Corporation
Kenosha, Wisconsin

Remember Dave? He used to work the machine next to yours. Then the accident happened. He used a screwdriver instead of a prybar. Lost an eye! And how about Bill, the company handyman? Pushed on a wrench instead of pulling, and wedged his hand between the wrench and the machine. Lost a finger!

Accidents similar to these occur frequently throughout industry. According to the National Safety Council, 2,200,000 workers were involved in on-the-job accidents last year — 14,200 of which were fatal. Statistics like these cannot continue to occur year after year at their present rate. They must be drastically reduced and one way of accomplishing this is through Hand Tool Safety.

Hand Tool Safety can be summarized in one simple phrase: "Use The Proper Tool For The Job." Knowing when and how to use a tool is of vital importance. That's where this "Hand Tool Safety Booklet" can help you. It not only describes but also illustrates the proper and improper use of the most popular hand tools available. Read the booklet carefully — then go back to your job and practice what you've learned. Remember, the only one who can make the information in this booklet effective is YOU, the worker for whose benefit it was created.

**AVOID BECOMING ONE OF NEXT YEAR'S STATISTICS.
MAKE HAND TOOL SAFETY A HABIT.**

The key factor in accomplishing hand tool safety is knowing how to select and use tools properly.



There are thousands of different tools available to do any particular job. The problem is deciding which is the best one to use. A good rule to follow in making this decision is: "Match the tool size to the job."



For example, the drive size of a wrench handle and socket is a good indication of the range of forces they are designed to handle.





You can't get the leverage you need with a handle that's too small, just as an oversized handle can apply more force than a small socket is designed to take.



Not only is the right handle size important but also the right type of socket. Sockets designed for power, hand, or impact use should never be interchanged.



Don't use sockets designed for hand tools on impact wrenches. They're not designed to take it and can break causing damage or injury.

Both power and impact sockets are of different hardnesses — power sockets need a higher hardness for longer wear while impact sockets used in short bursts need a lower hardness for less brittleness.

POWER
higher hardness
for
longer wear
(nut runners)

IMPACT
lower hardness
less brittleness
for
short bursts
(impact wrenches)

Again, it's "Picking the right tool for the job."



Here is a worker making two serious mistakes at the same time. First, he is using the wrong type of tool for the job and second, he is asking for a painful fall if something suddenly gives.





There is a safer way of doing this job. Use a heavy duty boxsocket and tubular handle — they are expressly designed for use on large fasteners. The worker is now also ready to catch himself if anything suddenly lets go.



Take a close look at the boxsocket. It has a built-in safety feature — the handle is secured with a button so that it doesn't slip off during use.



Another way to handle that really tough job is with a heavy duty sledge-type striking wrench.

Here's an example of using the wrong method. We just talked about the proper way to break loose a fastener. Ratchet drive sizes and handle lengths are designed proportionately for proper force. They're not designed to be used with pipes. A much safer and easier way to get the job done is with a gear multiplier. Less input force is applied therefore less chance of something giving and injury occurring.

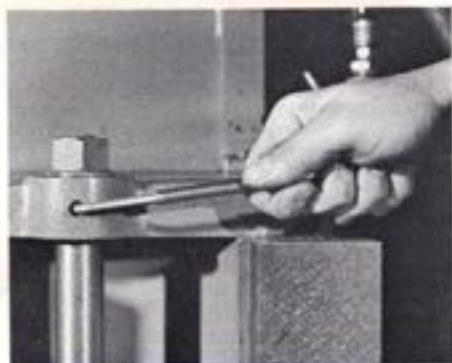


When replacing that fastener, brute force along with precision is needed. To get that force and still do it properly, the combination of a ratchet, a gear multiplier, and a torque indicating wrench, makes it possible to apply a minimal amount of input torque, yet achieve a high degree of output torque.

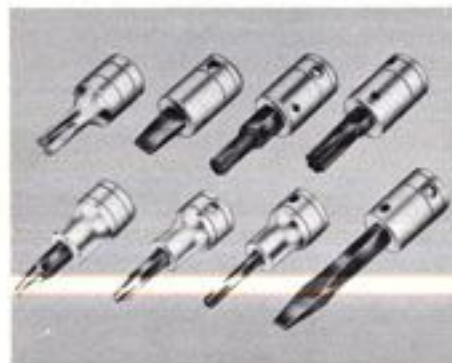


Many types of torque indicating wrenches for light, medium, and heavy-duty use have been designed for wherever precision and accuracy are required. A torque wrench is a very safe tool, since it makes it possible to apply the right amount of torque without over stressing either the tool or the fitting.





Even the wrong leverage on a small piece can cause banged knuckles. It's not necessary to use an extension pipe on a hex head wrench.



Various sizes and drives of hex head and screwdriver sockets are available to provide extra force and leverage when needed.



As a general rule, use the proper wrench that will get the job done, that is, the one that gives you the surest grip and a straight clean pull. The closest thing to a perfect wrench is a straight handled combination.

With a combination wrench, the solid grip of the box head end can be used to break loose a stubborn fastener, while the faster and more convenient open end head can continue the job.



Here's an example of an open end wrench supplying the right feel, right size, but not being the tool for the job. Because of the soft fittings on some machines a flare nut wrench should be used instead of an open end. It gently, yet safely, grips the fitting for surer turning.

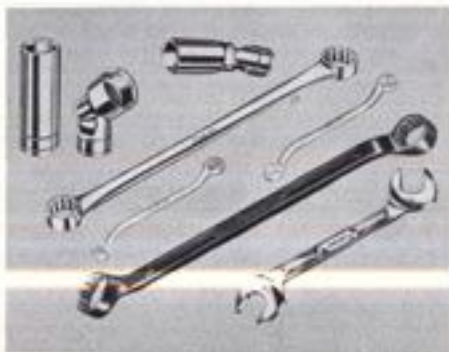


Regardless of the wrench, make sure you can get a solid square fit on the bolt. Cocking a wrench puts a concentrated strain on the points of contact. It is a frequent cause of tool failure under pressure.

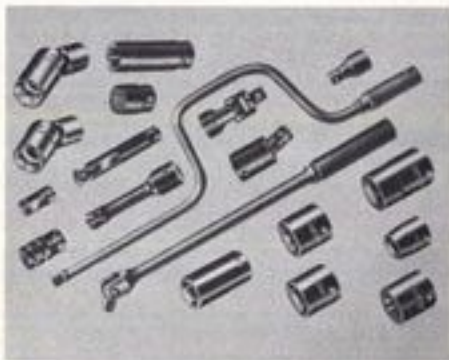




Instead of cocking the wrench, choose another tool designed for the job, such as this flexhead wrench.



Other types of wrenches such as the angle head, offset, and socket type give you the ability to work in difficult places and still get a straight clean pull.



The versatile socket wrench with its many attachments is one of the handiest turning tools available.

One of the faster, more convenient tools is the ratchet, but being more mechanically complex than other hand tools it needs a little more care and attention than most.



A periodic check for dirt and worn or damaged parts will help to avoid slippage and possible injury from ratchet failure under pressure. After the ratchet has been disassembled, clean the working parts, replace any that may be worn or damaged and add a few drops of oil to the mechanism.



The adjustable wrench is also a very convenient tool but it should never be used if a properly fitting solid wrench is at hand.





If you must use an adjustable wrench: 1. Make sure that the jaw is properly tightened down on the fitting; and 2. Apply force on the side with the stationary jaw.



The pipe wrench is extremely useful for the gripping and turning of cylindrical surfaces. The important thing to remember is that pipe wrenches are intended for use on pipes, never on nuts and bolts.



Here's a basic rule for whatever kind of wrench you're using, "Always pull wherever possible!" This will give more control over where you and the wrench are going.

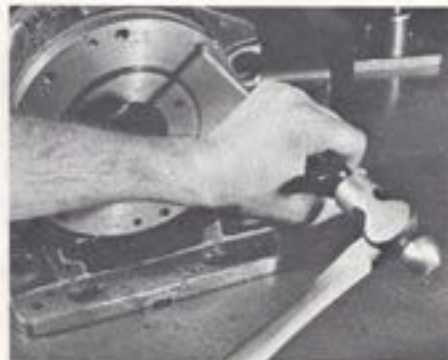
If you must push a wrench due to space limitations, do it with the palm applying force and the fingers clear of possible injury.



It's now time to take a close look at the most abused and misused hand tool available — the screwdriver.

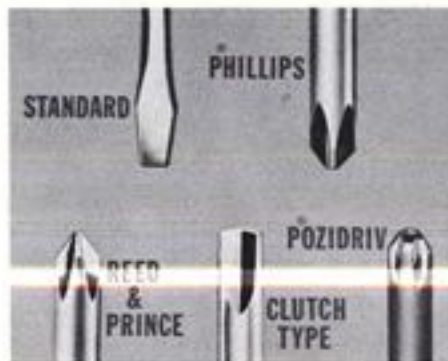


What makes a screwdriver so misused and mistreated? A worker will grab the nearest standard screwdriver and abuse it by using it for a chisel; or the closest Phillips for a punch, or even a big heavy duty screwdriver for prying.

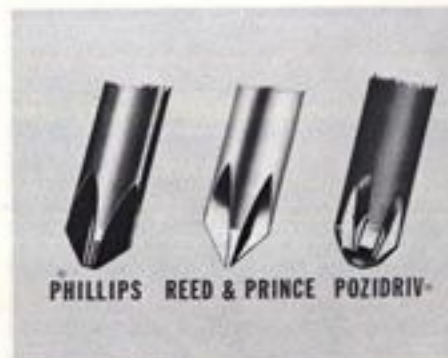




To properly use a screwdriver the worker must let the job itself determine the style and size of screwdriver to be used. If the blade fits the screw slot properly you'll get maximum turning power with minimum pressure.

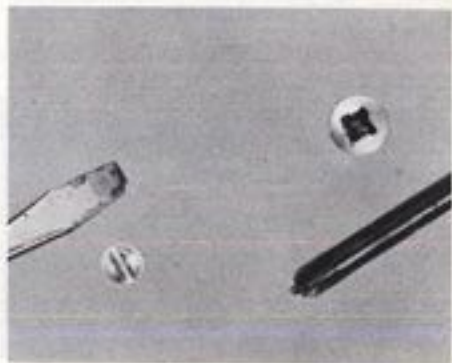


Even though you'll encounter a variety of different screw slots you must remember that there are certain screwdriver tips designed for them. In addition to the familiar standard and Phillips® tips, there are also special tips for Reed & Prince, Clutch-type or Butterfly screws, and POZIDRIV® cross-slot screws.



None of these are interchangeable but Phillips®, Reed and Prince and POZIDRIV® all look alike at a casual glance. There are, however, differences in the tips.

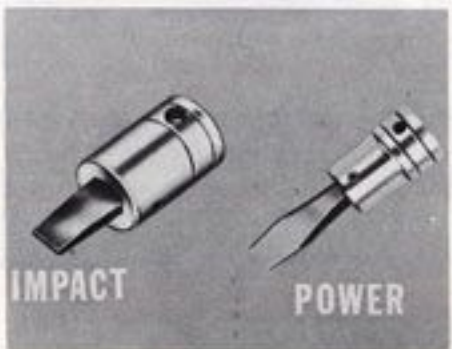
An improperly fitting blade tip will not only damage the screw slot but perhaps the tip itself.



A tip can easily be redressed to where it is safe and efficient to use. Never grind the tip as excess heat will destroy the metal's temper. Always file by hand — you will have more control over the shape of the tip.

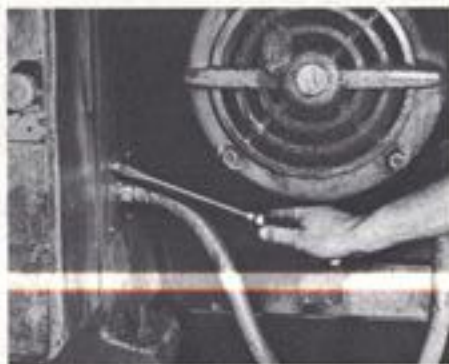


Certain screw driver tips are designed for use on power and impact wrenches. The standard screwdriver is intended for hand use and the force the hand can apply to the handle. Having the right tip and size, however, is not always a guarantee that nothing will slip.





This worker had his hand too close to the work. It is a good rule to keep your other hand clear when putting force on any type screwdriver.



Always have the screwdriver and the screw correctly lined up. You can't get a good grip in the slot if the tip is held at any angle.



If some obstruction prevents use of a standard length screwdriver, switch to one of the longer or shorter screwdrivers or even to an offset driver if necessary. That's what those specialized lengths and shapes are for.

Sometimes, extra hand force is needed in loosening or tightening a screw. If so, use a wrench and a driver specially designed for that purpose.

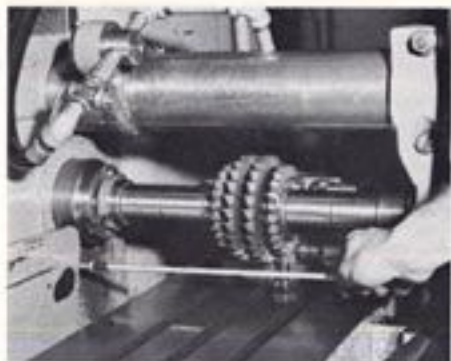


Screwdrivers designed for use with wrenches have either a square shank or a special bolster at the handle, to withstand the application of extra force.



Never use a pair of pliers to apply turning force to a screwdriver especially a standard round shank driver. In fact, never use a pliers to turn anything. Pliers are made for holding, pinching, squeezing and cutting, not for turning.

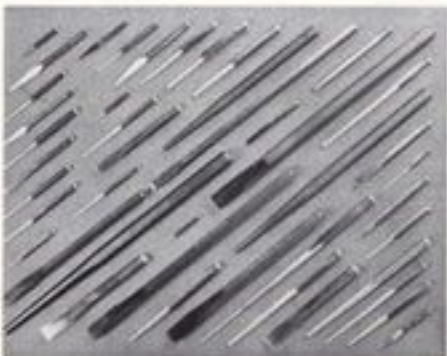




Here's a case of using the right tool instead of your hand. Don't reach down into a machine to start a screw by hand, use a screw starter and avoid possible injury.



The same is true if something is dropped into a corner or recessed area of a machine. Don't go after it with your hand. Magnetic pick-up tools were designed to do the job safely and quickly.



Earlier we discussed the most mis-used tools — Screwdrivers. Now we will discuss the most dangerous — Punches and chisels.

Punches and chisels, just by their very nature represent a special safety hazard. Here are several important rules to remember; Always wear approved safety glasses when working with these tools. Make sure that anyone else working nearby is warned of the possible danger of flying metal and protected against it by screening.



Avoid overstressing chisels by selecting one with the blade at least as large as the cut to be made. Never use punches and chisels on hardened material such as bearing races or locating pins.



When using a chisel on a small piece, clamp the piece firmly in a vise and chip toward the stationary jaw.





Hold the chisel with a special chisel punch holder. This will give you a firm, grip while keeping your hands out of the way of the hammer.



There are times when you can not use a holder due to space limitations. If so, hold the chisel firmly, but lightly, so that if you do miss, your hand can move with the blow and lessen its force. Strike straight down at the chisel, lightly at first, then with more firmness.



Chisels take punishment at both ends. The better quality ones have differential tempering giving them harder tips for longer cutting life and soft striking heads to resist splintering. The parabolic head of this chisel is designed to minimize mushrooming.

But mushrooming or upsetting is a natural result of use and wear. Every time your chisel needs sharpening also inspect the other end for mushrooming. This upset metal is dangerous and can fly off with bullet-like effect.

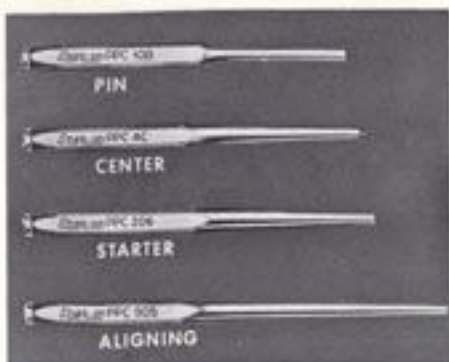


Grind off the mushroom leaving a flat head and tapered shoulder. Use a gauge to check the accuracy of the work. Don't forget — never let the chisel or punch get warmer than you can comfortably hold in your bare hand while grinding. Too much heat can remove the controlled temper in the metal.



After a period of time maintenance of the working end is also necessary. Returning the tip to its original shape and sharpness will assure top performance and economy. Always file the tip by hand — never grind.





Like chisels, punches are manufactured in a variety of designs for various jobs. Four common types are pin, center, starter and aligning punches.



In use, starter and pin punches are sometimes confused, which can be dangerous. The starter punch with its tapered shaft can stand the heavy blows required to knock out rivets or start pins moving.



The pin punch with its long straight shank can then complete the job. However, if a pin punch is used for a starting punch the straight shank may break. Use the right punch for the job and always use the largest punch the work will permit.

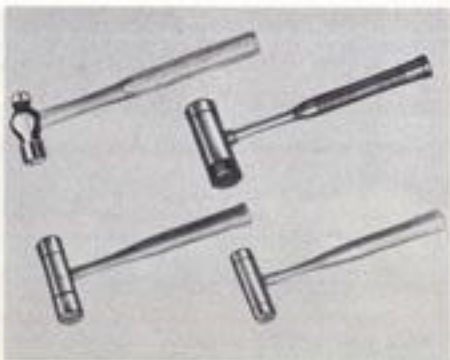
There are times when the use of a hand chisel and hammer are unsafe.



In this case a pneumatic air hammer and appropriate chisel can do the job safer and more efficiently. This air gun features a safety chuck which prevents the chisel from loosening and shooting out of the hammer.



Like punches and chisels, hammers are comparatively simple tools, but because of the forces involved they can also be safety hazards. Select a hammer that is the right kind, the right weight and the right size for the job.





Always inspect it before use, checking the handle for tightness and both the handle and head for cracks. Grip the handle towards the end and strike with the hammer face parallel to the surface of the workpiece. Above all keep your hand out of the way as much as possible.



A good safety rule to remember is "Never strike one hammer against another." A hammer can be made to chip if struck against another hammer or hardened surface resulting not only in damage to the hammer but possibly in bodily injury.



The file is another simple, straightforward tool which takes a lot of abuse and misuse. Here are two errors being made at the same time — using the file as a pry bar and using it without a handle.

By always fitting the file to a proper handle accidents can be avoided.



Use a file properly as shown here. Never hit it with a hammer. The tang is soft and bendable, but the body has to be extremely brittle to cut properly. When mistreated it can shatter as dangerously as glass.



Whether the tool is as simple as a file or as sophisticated as this gear puller the basic idea is always the same — Select the right tool for the job and learn how to use it correctly.





Here is someone who has not selected the right tool for the job.



The result — an accident!



A gear puller like this for instance is the only quick, easy and safe tool for forcing a gear, wheel, pulley or bearing off a shaft.

Jaws which lock onto the unit to be pulled increase speed and efficiency as well as safety.



Unlike pry bars and chisels a gear puller with a hydraulic power kit makes it possible to apply great amounts of force evenly and under constant control.



The ram is located away from the pump allowing you to position yourself a safe distance from the work while applying force.





So, the gear puller is a tool of tremendous power but power under control. With adaptors and a variety of yokes this tool can do hundreds of tough jobs safely and efficiently.



Here is another good example of power under control. Telephone and utility company linemen certainly can't use any surprises in their work. The use of an impact wrench instead of a power drill eliminates dangerous torque in heavy duty jobs like these.



Impact drilling is a safe and effective work technique developed where heavy drilling occurs under awkward conditions. Again it's using the right tool for the job.

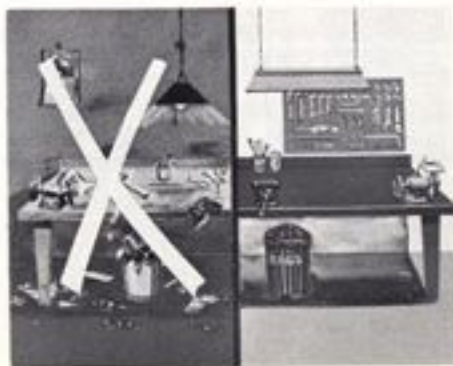
Remember — hand tool safety depends mostly on the man who uses the tool. Knowing what a tool is designed to do and how to use it properly is the key. So think safety and avoid surprises.



Surprises like these . . .



Avoid them by keeping your work area clear of potential safety hazards.





Select well made, well designed tools that are right for the job.



Use the safety equipment that is appropriate and required.



And remember — safety is largely common sense, and good sense too!

Today, it is fairly easy to find a quality tool designed to do just about any job. Of course one problem with tools is making sure you have them, where you need them, when you need them.

If the right tool for a job is not nearby we're usually tempted to use a substitute tool that's handy. For efficiency as well as safety, it is a good idea to keep as many "right" tools as possible near at hand and a mobile tool container is the right way to do it when your work covers a fair amount of territory.

Of course, once in a while, someone can't find the right tool for the job because it hasn't been produced yet. If this happens to you, let Snap-on Tools Corporation know about it.

We're constantly looking for new ways to do a better job and over the years the search for better and safer tools has resulted in the design of many new specials and often in the improvement of existing standard designs. But please for safety sake, let us help. Tool steel requires special handling and treatment. We're equipped to give it that, whereas most plant machine shops aren't.

The same applies to jury rigged or reworked tools. Tampering with the design may remove needed strength and reworking may destroy the metal's temper.

Some tools such as chisels are designed to be reworked and reused many times. Others such as sockets should be discarded and replaced when they become damaged or worn.

To make sure your tools are in the best condition keep them clean and free of oil, dirt and grit. They'll be easier to use and you can also inspect them more easily for wear and damage.

Your **Snap-on** Representative will be happy to discuss your safety program with you and answer any questions you may have.

